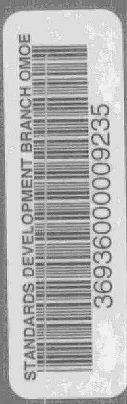


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BETZ



REPORT ON A WELL AND WATER POLLUTION SURVEY

Village of Cannifton and
North Sidney Street Area,
Township of Thurlow

April, 1974



Ministry
of the
Environment

The Honourable
William G. Newman,
Minister

Everett Biggs,
Deputy Minister

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REPORT ON A
WELL AND WATER POLLUTION SURVEY
OF THE
VILLAGE OF CANNIFTON
AND
NORTH SIDNEY STREET AREA
IN THE
TOWNSHIP OF THURLOW

SANITARY ENGINEERING BRANCH
REGIONAL ENGINEERS SECTION
APRIL, 1974

REPORT ON A
WELL AND WATER POLLUTION SURVEY
OF THE
VILLAGE OF CANNIFTON AND
NORTH SIDNEY STREET AREA

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REPORT ON A WELL AND
WATER POLLUTION SURVEY OF THE VILLAGE OF CANNIFTON
AND NORTH SIDNEY STREET AREA

INTRODUCTION

A well and water pollution survey of the Cannifton and North Sidney Street area was conducted over the period of July 10, 1973 to August 30, 1973. After locating and recording the unsatisfactory well systems, an evaluation of the causes of pollution and the practices which might be taken to relieve or solve the problem was emphasized.

A general study of the area and its nature of water supply has led to an overall acceptance of the recommendations presented in this report.

BRIEF HISTORY AND LOCATION

The Village of Cannifton is located just north of the City of Belleville in the Township of Thurlow. Situated along the Moira River, the area was first settled in the early eighteen hundreds, and was known as the gateway to northern townships. John Canniff built a grist mill in Cannifton and encouraged settlement of the area. With a recorded population of 1,000 in 1866, after 1900, Cannifton became a fairly quiet village. Today, the community is once again growing as the old farms are being subdivided. With Belleville less than half a mile away, growth is inevitable in years to come.

The Sidney Street area subdivision (shown in the appended map) has just recently experienced a considerable expansion. It is merely an extension of one of Belleville's main streets and it accommodates many commuters to the city. Approximately 80 to 90 families are now residing in the subdivision and increased development is in line for the future.

INTERVIEWS WITH OFFICIALS

The co-operation and assistance offered by the following, during the survey was deeply appreciated:

Mr. C. Horton, Clerk, Township of Thurlow

Mr. L. Ellenton, Hastings & Prince Edward Counties Health Unit

TOPOGRAPHY AND SOIL CONDITIONS

The Village of Cannifton and surrounding area is located in a region previously submerged in the waters of prehistoric Lake Iroquois. The effects of glacial actions are evident in the existing formations. Groups of scattered Drumlins consisting of a glacio-fluvial material (clays, coarse gravel and sand) are found throughout this region of South Eastern, Ontario.

A small intermittent stream situated just South of Corbyville aids in the drainage of the Cannifton area. It is usually dry during the summer months. The clearing and drainage of the township over the years has dried up many of the creeks that formerly had made the Moira a deep strong flowing river.

INDUSTRIAL OUTLOOK

The main industry in the Community of Cannifton is a modern grist mill located just south of the village bridge, on the east side of the river. Corby Distilleries, which is situated about one mile upstream from the area utilizes the Moira River as it's main source of raw water.

PRESENT SERVICES AND GROUNDWATER CONDITIONS

The residents depend on individual water supplies and sewage systems, excluding a few small communal systems. The well capacities vary considerably within the area but the residential demands are generally met throughout the year. The majority of the wells are drilled.

In October, 1969, a partial survey was carried out in the area and because of some adverse results (gas, salt problems), it was suggested that a water system be installed. Further surveys, including this one have since been employed to substantiate the existence of the problems and the need for correction.

WELL SURVEY

The survey team attempted to gain a bacteriological sample from each well in the Community of Cannifton and the Sidney Street Subdivision area but as expected a certain number of residents were not home at the time. On the overall, public cooperation was good.

Chemical samples were also obtained from several of the wells in the area.



Falls located in the Moira River at Cannifton (January, 1974). Fairly high winter flow is evident.



Photograph depicts characteristic landform features of the survey area.

These samples were later analysed for hardness, alkalinity, iron, chlorides, pH, total nitrogen, total phosphorus and sulphates.

BACTERIOLOGICAL RESULTS

The bacteriological samples were analysed at the Ministry of the Environment Mobile Laboratory in Kingston, Ontario. The analysis was conducted according to "Standard Methods".

The groups of bacteria investigated for each sample were: total coliforms, fecal coliforms and fecal streptococci. These organisms are used as "indicators" of fecal contamination. A number of diseases common to man can be transmitted by feces. Such an occurrence is more probable in areas where the water is contaminated. These indicator organisms in the water denote the presence of fecal contamination (stemming mainly from human or animal excrement) and hence the risk of disease causing organisms.

Results are as follows:

Table I presents a summary of the well survey results involving the Community of Cannifton and its immediate area.

Table II presents a summary of the results obtained in the Sidney Street area.

TABLE I

BACTERIOLOGICAL RESULTS

Summary of the well survey in the Village of Cannifton and immediate area.

No. of wells sampled	77
No. of drilled wells	45 (59%)
No. of dug wells	24 (31%)
Other	8 (10%)
* Samples satisfactory	23 (30%)
** Samples doubtful	22 (29%)
*** Samples unsatisfactory	32 (41%)
* Satisfactory (total coliform organisms = 0) (fecal coliform organisms = 0)	
** Doubtful (total coliform organisms ≤ 4) (fecal coliform organisms = 0)	
*** Unsatisfactory (total coliforms ≥ 4) (fecal coliform bacteria = present)	

TABLE II

BACTERIOLOGICAL RESULTS

Summary of well survey in the North Sidney Street Area

No. of wells sampled	49
No. of drilled wells	44 (90%)
No. of dug wells.....	3 (6%)
Other	2 (4%)
* Samples satisfactory	32 (65%)
** Samples doubtful	7 (14%)
*** Samples unsatisfactory	10 (21%)
* Satisfactory (total coliform organisms = 0) (fecal coliform organisms = 0)	
** Doubtful (total coliform organisms ≤ 4) (fecal coliform organisms = 0)	
*** Unsatisfactory (total coliform organisms ≥ 4) (fecal coliform organisms = present)	

DISCUSSION OF THE SURVEY BACTERIOLOGICAL RESULTS

The appearance of coliform organisms in a 100 ml sample of water immediately classes the water as doubtful or unsatisfactory for human consumption.

A "doubtful" classification was given when the total coliform bacteria count was four or less and there was no fecal coliform bacteria present. A doubtful sample signifies the possibility that more dangerous pollution could occur with conditional changes. These changes may include heavier pollution at the source, heavier surface runoff or high groundwater levels. An "Unsatisfactory" classification is assigned to samples having coliform organisms in quantities greater than four or showing signs of the presence of fecal coliforms. Such sources are potentially dangerous to the user's health and should not be consumed unless properly treated. If no coliform bacteria were found in the sample, then the water was classified as "satisfactory".

Generally, wells that were classified as unsatisfactory were found to contain high counts of total coliform bacteria but no fecal coliforms. This abnormal condition was considered when interpreting the survey results.

Although of a small percentage in this survey, the dug wells with depths of 15 to 20 feet, found to have coliform counts listed as "doubtful" (≤ 4 per 100 ml) should be given sufficient attention to properly prepare their supply

for safe human consumption.

I THE SIDNEY STREET AREA

Most probable sources of such contamination are:

- a) close proximity of sewage and water installations
- b) failing of walls and/or cover of the existing wells.

Every resident utilizing a well that contained coliform bacteria was sent notice of such results by mail.

Because of the large number of systems involved in the survey, the entire list of compiled data on each well will not be presented here. If desired, this information can be readily made available to those concerned.

II THE CANNIFTON AREA

Generally a high percentage of the dug wells contained total coliforms exceeding the set limits per 100 ml sample of water, rating them as unsatisfactory for human consumption. Out of this percentage, a very low measure of fecal coliform was found. Such results label those wells involved harmful to the residents (unsatisfactory) and proper treatment is essential.

The drilled wells showing signs of coliform bacteria in general indicate the poor positioning of sewage and well facilities. In such a case the sewage effluent wasn't provided with adequate treatment.

Occupants utilizing a well rated, doubtful or unsatisfactory, were informed of the situation and given a brief description of remedial measures that could be taken to possibly correct the problem.

As in the Sidney Street area survey, the entire list of compiled data is not presented in this report, but is available upon request.

CHEMICAL RESULTS

Chemical samples were taken from ten wells ranging in depth from ten to one hundred feet.

Following are the mineral constituents commonly found in natural waters that may have an effect on the value of the waters for domestic use.

1. Hardness (CaCO_3) - is basically concerned with calcium and magnesium compounds and refers to the amount of soap required to precipitate these chemical compounds before a lather is produced. In this area, the hardness is probably caused by natural accumulations of salts from limestone contact. All of the wells sampled gave signs of fairly hard water.

2. Alkalinity (CaCO_3) - is associated with high pH values, hardness and excessive dissolved solids all of which may cause undesirable problems within one's system. Of the wells sampled, an average of 282 ppm value was found present.

3. Iron (Fe) - originates from igneous and sandstone rocks, iron pipes, pumps and other fixtures. Two of the wells sampled exceeded the 0.3 ppm criteria for Iron, set by the Ministry of the Environment.

4. Chloride (Cl) - has a salty taste and could be harmful to your health. It is usually derived from natural mineral sources but may be a sign of human sewage contamination. Two of the wells analysed for chemical content were found to be above the level of 250 ppm set by the Ministry of the Environment. Past investigations of complaints of poor water showed that salt seepage from nearby stock piles of mixed salt and gravel were the cause of the contamination of some wells in the area.

5. Nitrates (N) - usually originate from plant debris, animal excrement, fertilizers and sewage wastes. A limit of 10 ppm has been established by the Ministry of the Environment. In the survey, one of the ten sampled wells was found to exceed this concentration. Such a case could be considered the result of sewage leaching into the groundwater supply.

6. Sulphates (SO_4) - causes permanent hardness in water and aids in scale formation. A concentration of 250 ppm has been set as desirable because of the laxative action it presents. In all of the samples taken, it was found that the sulphate content was well below this level.

SOURCES OF CONTAMINATION

The following have been accepted as the main sources of well

contamination in the area covered by the survey. To evaluate these results, overall estimation has been applied from spot check analysis.

1. The close proximity of sewage systems and groundwater supplies is considered one of the main sources of the existing problems. This area was settled long before proper design and layout was established for such systems and as a result, many of its facilities are situated much closer to each other than they should be. Small existing lots containing the water systems inevitably are experiencing problems of well contamination.

2. The deterioration or faulty construction of some of the wells located in the Cannifton area is also a direct cause of contamination. Such a situation permits the access of surface water into the groundwater supply.

3. In 1968, complaints of salty water in Cannifton first brought to the attention of the former Ontario Water Resources Commission the need for a survey in the area. Surface runoff from local salt piles was found to be the source of the contamination. The relocation of the piles has since resolved the situation, but such an occurrence implies the eventual need for a more efficient municipal supply in the area.

4. Reports of gas and fuel oil seepage from a local service station in 1968 were proven to be the cause of specific well contamination. Slight traces of these contaminants were found in the course of this survey. The main problem has since been corrected by the proprietor of the station and it is assumed that these remaining signs simply stem from the effect of the former leakage on the surrounding ground area.

5. The water quality of the Moira River is in danger as a result of improper positioning of buildings along its shores. Numerous sites are situated not more than ten to twenty feet from the river banks, suggesting insufficient seepage area and thus a fair amount of undesired contamination to the river.

CORRECTIVE MEASURES

Groundwater is very susceptible to contamination as a result of the

seepage of domestic wastes into subsurface water systems. If the local physiography is unfavourable as a natural settling filter, as is the case in the surveyed area, the problem is intensified. In the Cannifton and Sidney Street area this becomes a problem when the water and sewage facilities are located too close to each other to function properly. Relocation of such systems could be taken as an initial step but the installation of a municipal system would be of great advantage to the situation.

Wells found to be highly contaminated were scattered without any particular pattern, throughout the survey area. The following list of corrective measures should be utilized by residents in the Sidney Street area to ensure the acceptable quality of their water system.

1. A check of the casing installed in drilled wells should be carried out to ensure that it is of sufficient length to prevent impairment of the ground-water quality. One should also ensure that the well is properly capped to prevent the entry of water or other foreign materials. Similar action should be taken with regards to dug wells equipped with sanitary hand pumps.

2. Residents obtaining an unsatisfactory bacteriological sample of their domestic supply should first inspect for access routes of polluting materials to the well. When found, these should be permanently removed. Following these correction measures, the supply source should be chlorinated, allowing a chlorine contact period of approximately six hours, then flushed, but not into a septic tank.

Apply a chlorinated laundry bleach (Javex) in sufficient quantity to disinfect the entire volume of water in the well. The following table may be used to calculate the amount of chlorine to be added, knowing the diameter and water depth of the well. (strength of bleach assumed as 5% available chlorine)

<u>Diameter of well casing in inches</u>	<u>Chlorine Bleach (Javex) per 10 ft. depth of water</u>	
	<u>One to ten coliforms</u>	<u>More than ten Coliforms</u>
4	0.5 oz.	1.0 oz.
6	1.0 oz.	2.0 oz.
8	2.0 oz.	4.0 oz.
12	4.0 oz.	8.0 oz.
16	7.0 oz.	14.0 oz.
20	11.0 oz.	22.0 oz.
24	16.0 oz.	31.0 oz.
30	25.0 oz.	49.0 oz.

If another bacteriological sample, collected approximately after one week of use, is again found to be adverse, the resident should consider chlorination on a continuous basis. Small hypochlorinators can be obtained from companies in the area at a cost varying between \$150 - \$200.

The following steps should be taken to ensure proper sewage control:

1. Some septic tankssystems close to private wells should be relocated.

The health unit recommends that a septic tank should not be closer than 50 feet to a drilled well and 100 feet to a dug well. Naturally these are minimum distances as greater separation is desired.

2. Subsurface systems constructed many years ago and on rock may need upgrading. The most advanced techniques would be required when constructing a system under these adverse conditions.

3. Residents are encouraged to pump out their septic tank systems every two or three years. This will result in a longer life for the system.

The local land committee should seriously review each land severance in an effort to prevent water and waste treatment facilities from being constructed on small lots or where there is inadequate soil coverage.

POSSIBILITIES OF A FUTURE MUNICIPAL SUPPLY

One of the main purposes of this report is to provide specific evidence as to the necessity or demand for a municipal water system in the surveyed area. From the results obtained, it is concluded that, to a large extent, private

water and sewage systems seem to meet the needs and required standards of the residents of the Sidney St. Subdivision district, at the present time, although with future growth and expansion, a municipal system may become essential. Until such a time, private treatment is adequate in properly controlling wells subject to bacterial growth.

In the Cannifton area, the signs of a generally poor quality of water (41% unsatisfactory, 29% doubtful) denote the significant need for a municipal system in the near future.

SURFACE WATER POLLUTION SURVEY

In the month of August, 1973, a surface water study was carried out along the Moira River at four specific points. The list of the locations sampled and the results are found in appendix six of this report. An overall assumption can be made from the information gained in the analysis. With a fecal coliform to enterococcus ratio far below 0.7 for all of the samples, it appears that the pollution present within the system is derived predominantly or entirely from livestock or poultry wastes in that particular area. High bacteria counts were found at each of the sampling points, indicating the severe extent of the problem.

Samples for bacteriological and chemical analysis were collected at three points along the Moira River, (as listed in appendix five) between January and December of 1972.

The results show that the water quality has not severely deteriorated along this particular section of the river. For purposes of recreational body contact, the river seems quite acceptable.

DESIGN REPORT ON A FUTURE WATER SYSTEM

On December 11, 1970, Mr. P.G. Cockburn, P. Eng., Director of Project Development, advised Gore and Storrie Limited of their appointment for the preparation of design reports on both sewage and water works systems for the Township of Thurlow. The reports have since been drawn up and a total cost of the proposed twenty-year programme is \$2,792,500.00. Such a project is almost

inevitable for the area to handle future expansion and cope with poor water quality, especially in the Cannifton area.

SUMMARY

As a result of numerous complaints of poor water quality and the question of a possible municipal water supply, a well and water pollution survey was conducted in the Cannifton and Sidney St. Subdivision area during the summer of 1973.

From the bacteriological examination of the wells in the Cannifton area, it was found that only 30% of the wells were satisfactory, 29% were doubtful and 41% were unsatisfactory.

In the Sidney St. Subdivision, 65% of the wells were found to be satisfactory while only 21% were unsatisfactory. The water quality survey taken of the Moira River indicated no adverse results but the heavy flow of the water-body should be taken into consideration when reviewing these results.

RECOMMENDATIONS

SIDNEY ST. SUBDIVISION

1. Because of poor positioning of certain septic tank systems in relation to private wells, it is advisable that these subsurface systems be relocated.

2. Residents utilizing a well found to be polluted should take proper action to correct the problem. Individual correction can be considered as an initial step in solving the problem. One should ensure that surface drainage does not enter the well. Batch chlorination and resampling of wells classed as "doubtful" is recommended to eliminate the biological activity that was found to be present.

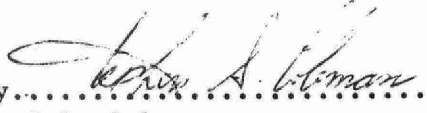
THE CANNIFTON AREA

1. A municipal system is the most appropriate answer to the poor water quality situation in the Cannifton area. With the history of problems found here, such a system should be installed.

GENERAL RECOMMENDATIONS

The major problem in the area is the fact that some of the wells may be contaminated by a source or sources of pollution beyond the control of the concerned well owners. There are two main alternatives for correction in such a case. An intensive survey could be made of each individual system by qualified technicians. Such a survey would require a large amount of time and the results cannot necessarily be guaranteed. The other alternative is to construct a municipal water and sewage system for the community. This would provide the required water quality as well as allow for future expansion and development.

SSC/jmc

Report prepared by.....
S.S. Coleman,
Sanitary Engineering Branch.

REFERENCES

1. Water Quality Data - concerning the Moira River 1973
2. Guidelines and Criteria for Water Quality Management in Ontario -
Ontario Water Resources Commission, June 1970.
3. Provincial Water Works Programme #5-0129-70, Gore & Storrie Ltd.,
Consulting Engineers, Toronto, Ontario. August 1971

APPENDIX ONE

GLOSSARY OF PERTINENT TERMS

- Biochemical Oxygen Demand (BOD) - is the amount of dissolved oxygen in parts per million (ppm) required for the stabilization of organisms present in water. It is measured over a 5-day period, at a temperature of 20°C.
- Coliform Organisms - are the normal inhabitants of the intestines of man, other warm blooded animals and soils. The presence of fecal coliforms in a system is a sign of very recent pollution by man or warm blooded animals.
- Total Geometric Mean - calculation of the geometric mean is employed in the analysis of Bacteriological results in order to obtain an appropriate summary of the data involved. The log of each result is taken with the assistance of a log table. Then the arithmetic **average** of the logs is calculated and the antilog of this average is found. This antilog value is the geometric mean.

APPENDIX TWO

COPY OF LETTER SENT TO MUNICIPALITY OUTLINING DATE OF SURVEY

275 Ontario Street, Kingston, Ontario. K7K 2X5 546-3171

July 10, 1973.

Township Council,
Township of Thurlow,
Box 128,
Cannifton, Ontario.

Attn: Mr. C.B. Horton, Clerk

Dear Sir:

Re: Well Survey - Cannifton

This letter is to acknowledge the water sampling survey scheduled for the Cannifton area commencing July 10, 1973. Notification of this survey was made to Mr. Clara Horton, Township Clerk, on July 4, 1973 by telephone, to ensure a proper period of time for publication. The survey itself will involve the sampling of private wells throughout the community and immediate area. Home owners will be asked questions concerning their own facilities.

The survey is one of routine which is conducted on most communities. The co-operation of the residents will be greatly appreciated while conducting this operation.

Yours very truly,

GJMc/lc

L.G. South, P. Eng.,
Regional Engineer,
Sanitary Engineering Branch.

APPENDIX THREE

COPY OF A LETTER SENT TO RESIDENTS OF THE SURVEY AREA INFORMING THEM OF
BACTERIOLOGICAL RESULTS

MINISTRY OF THE ENVIRONMENT

Date September 28, 1973

Re: Township of Thrulow - Community of Cannifton & Area
Private Well Survey

On August 7 a bacteriological water sample was collected and
upon examination the results were as follows:

Total Coliform Organisms 11,000

Fecal Coliform Organisms 0

The quality of this water for drinking purposes as on the date of
sampling is designated:

Satisfactory

Doubtful

Unsatisfactory

Total Coliform organisms are found in human excrement, animal
excrement and the soil. The Fecal Coliform organisms are definite indicators
of human or animal excrement. The presence of these organisms, although not
harmful in themselves, suggest the possibility that pathogenic bacteria or
viruses may be present. For safety reasons, any water supply which shows
the presence of any total and/or fecal coliform organisms upon sampling
should not be used for consumption unless previously boiled or adequately
disinfected. Procedures for disinfection using household javex bleach have
been appended.

Following disinfection, the supply should be resampled to ensure
that the contamination has been eliminated.

Finally, it is not unusual for shallow type wells to be periodically
contaminated, especially in the spring and fall. Therefore as a precaution,
disinfection of your well together with sampling should be undertaken each
spring and fall.

If we can be of any further assistance, please do not hesitate
to contact this office.

Yours very truly,

L.G. South, P. Eng.,
Regional Engineer,
Sanitary Engineering Branch.

APPENDIX FOUR

VILLAGE OF CANNIFTON & SIDNEY ST. SUBDIVISION AREA AUGUST, 1973

CHEMICAL QUALITY OF PRIVATE WELLS

<u>Sample No.</u>	<u>Hardness as CaCO₃</u>	<u>Alkalinity as CaCO₃</u>	<u>Iron as Fe</u>	<u>Chloride as Cl</u>	<u>pH at Lab.</u>	<u>Nitrogen as N</u>		<u>Nitrite</u>	<u>Nitrate</u>	<u>Phosphorus as P</u>		<u>Sulphate as SO₄</u>
						<u>Free Ammonia</u>	<u>Total Kjeldahl</u>			<u>Total</u>	<u>Soluble</u>	
CLD-27	230	292	0.05	119	7.6	-	-	-	.01	-	-	44
CLD-30	448	324	0.05	119	7.2	-	-	-	13	-	-	56
CLD-3	276	296	0.95	47	7.6	-	-	-	-	-	-	45
CLD-12	276	290	-	101	7.3	-	-	-	-	-	-	21
CA-38	242	214	-	52	7.5	-	-	-	-	-	-	-
CA-19	474	304	-	259	7.3	-	-	-	-	-	-	-
CA-48	274	234	-	234	7.8	-	-	-	-	-	-	-
CA-44	300	246	-	34	7.6	-	-	-	-	-	-	-
CA-51	344	320	-	76	7.6	-	-	-	-	-	-	-

CLD-27 Mr. G. Empey, R.R. # 5, Belleville

CLD-30 Mr. J. Logues, R.R. # 5, Belleville

CLD-18 Mr. K. Davidson, R.R. # 5, Belleville

CLD-3 Mr. A. Armonas, R.R. # 5, Belleville

CLD-12 Mr. E. Webber, R.R. # 5, Belleville

CA-38 Mr. D. Dalmage, Cannifton

CA-19 Mr. W. Chamberlain, Corbyville

CA-48 Mr. W.E. Crook, Cannifton

CA-44 Mr. W.G. MacPherson, R.R. # 6, Belleville

CA-51 Mr. W.E. Armstrong, Cannifton Bos # 37

APPENDIX FIVE

WATER QUALITY INFORMATION FOR THE MOIRA RIVER - 1972

Sample No.	<u>Bacteriological Results</u>				Water Temp. °C	Diss. Oxygen /100ml	BOD 5-Day /100 ml	Total Phosphorus as P	Soluble Phosphorus as P	NH ₃ as N /100ml	Total Kjeldahl /100 ml	NO ₂ as N /100ml	Turbidity JTU /100 ml	Chloride as Cl /100 ml
	<u># of Samples /100 ml</u>	<u>Total Coliform /100 ml</u>	<u>Fecal Coliform /100 ml</u>	<u>Fecal Streptococci /100 ml</u>										
MR-1A	24	389	8	8	9.7	11.0	1.6	0.068	0.0113	0.04	1.284	0.009	7	7
MR-2A	22	128	4	3	11.8	9.6	1.5	0.031	0.010	0.029	0.97	0.009	3.8	6
MR-3A	21	207	14	3	9.8	10.2	1.75	0.036	0.013	0.05	0.67	0.006	4.4	4.9

Sample
Pt. No.

MR-1A - Footbridge N. Hwy. # 2, Belleville
 MR-2A - Bridge in Cannifton
 MR-3A - Stoco Lake Outlet

(Note: the above bacteriological results
 have been calculated by the
 Geometric mean method. See Appendix
 One for explanation).

APPENDIX SIX

SURFACE WATER SURVEY

MOIRA RIVER (AUGUST, 1973)

CHEMICAL RESULTS

<u>Sample Pt. No.</u>	<u>BOD 5-DAY /100 ml</u>	<u>pH at Lab.</u>	<u>SOLIDS</u>		<u>Nitrogen Free</u>				<u>Phosphates</u>		<u>Turbidity in Formazine</u>
			<u>Total</u>	<u>Suspended</u>	<u>Kjeldahl</u>	<u>Ammonia</u>	<u>Nitrite</u>	<u>Nitrate</u>	<u>Total</u>	<u>Soluble</u>	
MR-1B	3.5	8.4	170	5	0.87	0.22	0.005	<0.01	0.045	0.017	5.8
MR-2B	2.5	8.3	170	5	0.67	0.13	0.004	<0.01	0.034	0.008	4.0
MR-3B	4.8	8.5	180	5	0.75	0.01	0.003	<0.01	0.040	0.008	5.1
MR-4B	2.0	8.7	180	5	0.70	0.12	0.003	<0.01	0.031	0.013	3.9

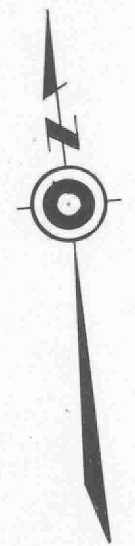
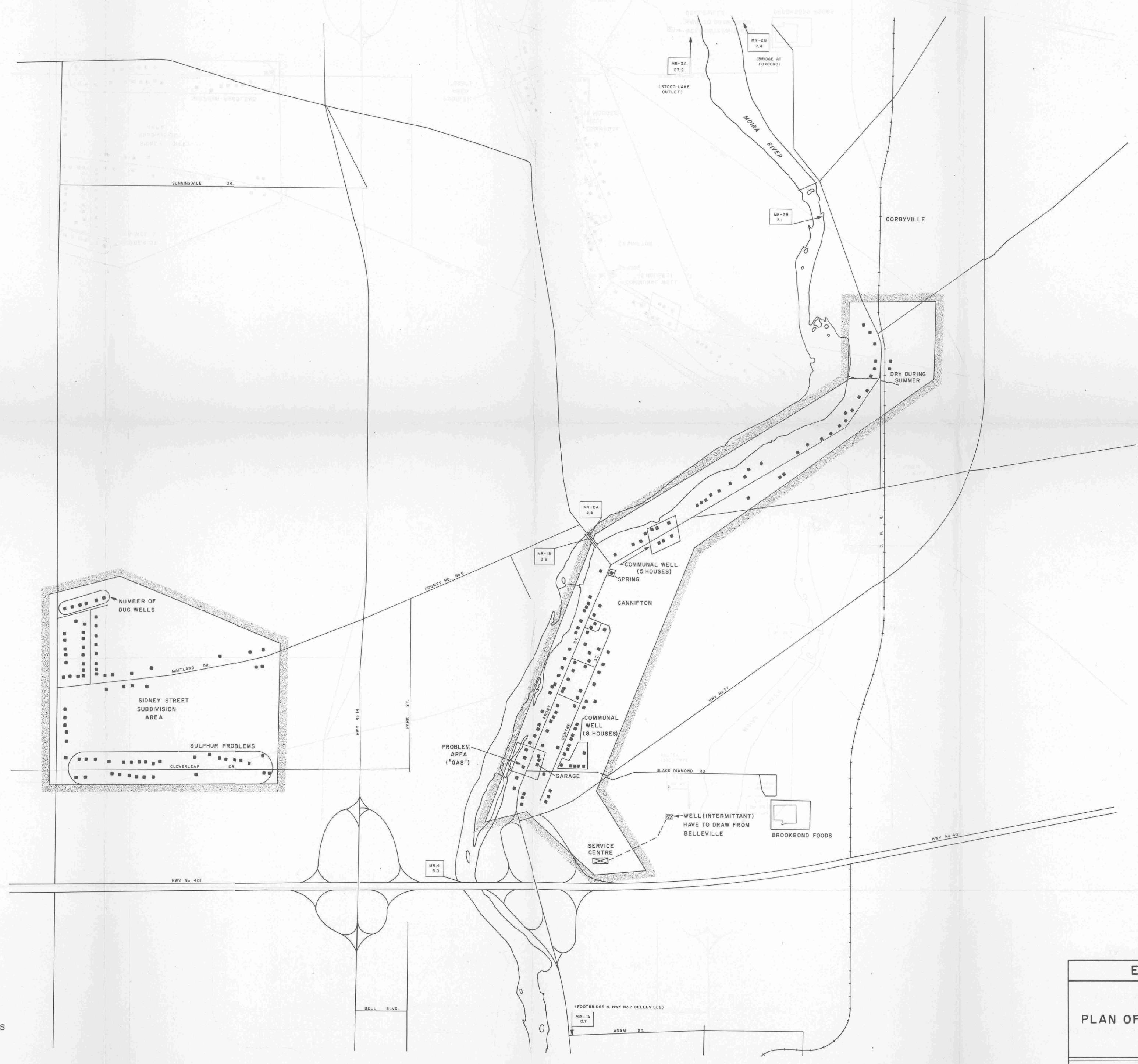
BACTERIOLOGICAL RESULTS

<u>Sample Pt. No.</u>	<u>Total Coliforms /100 ml</u>	<u>Fecal Coliforms /100 ml</u>	<u>Fecal Streptococci /100 ml</u>	<u>Ratio of Fecal Coliform to Fecal Streptococci</u>
MR-1B	5,650	8	698	0.01
MR-2B	1,850	12	1,436	0.008
MR-3B	6,000	30	974	0.03
MR-4B	2,550	24	626	0.038

MR LOCATIONS

MR-1B - Moira River, 3.9 miles from mouth
 MR-2B - Moira River, 7.4 miles from mouth
 MR-3B - Moira River, 5.1 miles from mouth
 MR-4B - Moira River, 3.0 miles from mouth

(MR locations are also indicated on map enclosed in report)



LEGEND

- MR-1A 0.7 RIVER SAMPLING POINT SHOWING MILEAGE
- AREA INVOLVED IN SURVEY
- POSSIBLE SERVICE CONNECTIONS

ENVIRONMENT ONTARIO	
TOWNSHIP OF THURLOW PLAN OF WELL AND WATER POLLUTION SURVEY AREA	
SCALE: NOT TO SCALE	
DRAWN BY: R.S.	DATE: MARCH 1974
CHECKED BY	DRAWING N ^o : 74-17